Emergency Services

EMERGENCY SERVICES

Summary

- Emergency services are critical to life and safety and reviewing these systems for Year 2000 problems must be of the highest priority.
- Emergency communications are made up of a collection of different services including 911 calls, dispatch services, wireless communications to response teams, and the Emergency Alert System. These systems are owned by different entities and made up of different equipment. This increases the difficulty and the need for cooperation.
- Of critical concern is the Public Safety Answering Point where many networks come together and many different systems are employed. This creates a challenge for local governments and entities charged with readying these services.
- Manufacturers indicate that they have been engaged in Y2K outreach programs, and groups such as the Telco Year 2000 Forum have been testing emergency equipment.

INTRODUCTION

The Commission has been working with communications providers, broadcasters, equipment vendors, public safety professionals, and other government officials to identify critical elements within the emergency communications system, and to encourage appropriate action. The public safety communications network consists of four distinct elements, although not all elements are necessarily involved in every emergency situation. These elements are:

- The transmission of the alert, typically through a 911 telephone call;
- The processing of the call, usually at a Public Safety Answering Point (PSAP) or other public safety operator or communications center;
- Dispatching the "first responder," usually by a wireless radio system; and,
- If necessary, alerting the general public through the Emergency Alert System (EAS). EAS is generally invoked in situations involving serious local, state, or national emergencies, which may be broadcast by radio, television, or cable channels.

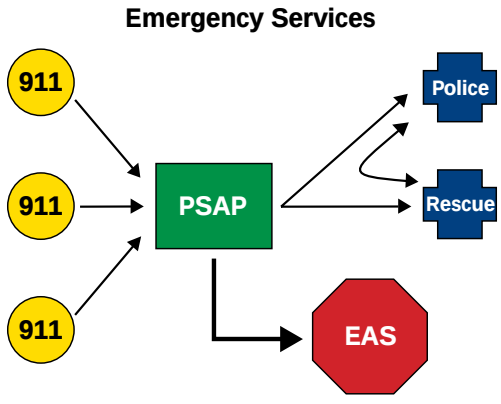

Figure 1. Emergency Services

Each of these elements must function properly in order for the system to react effectively to an emergency. These components, however, typically are managed or controlled by different entities and are regulated by various levels of government. Thus, a cooperative effort is important when it comes to preparing emergency services for the Year 2000. At the local level, these government entities include city, county, and other organizations responsible for public safety. At the national level, these entities include, but are not limited to, the Federal Emergency Management Agency (FEMA), the Department of Justice (DOJ), the Department of Defense (DOD), and the Commission. To assist these governmental entities and other interested parties in understanding the potential Year 2000 vulnerability of their emergency communications systems, considerable testing of these systems and their components has been done. For example, the Telco Year 2000 Forum has been testing 911 emergency numbers; information regarding that testing was released on March 3, 1999.

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Maintaining accurate and effective emergency communications during the Year 2000 date rollover is a high priority. The challenge, however, lies in the fact that emergency communications require several distinct systems to interoperate seamlessly to ensure timely response by emergency personnel. Robert Miller, Technical Issues Director of the National Emergency Number Association (NENA), testifying at the Commission's Year 2000: Maintaining Emergency Response Communications Forum said "virtually every link in the emergency chain involves complex interrelated processes and everywhere there are time-date stamps." Any scenario involving a malfunction in emergency services creates a significant risk of harm.

911 Telephone Calls and Public Safety Answering Points

There are approximately 300,000 emergency calls per day in the United States. The 911/E911 Emergency Reporting System is the portion of the emergency communications system that enables a caller to dial a common three-digit number for all emergency services. Today, over 90 percent of the population is covered by some form of 911.

Enhanced 911 (E911) is an advanced form of the basic 911 service. With E911, the telephone number of the caller as well as other stored information about the location of the caller is transmitted to the PSAP where it is cross-referenced with an address database to automatically determine the caller's location. The emergency dispatcher can then use this information to direct public safety personnel responding to the emergency.

The first step in an emergency communication involves the call from the person reporting the emergency to the appropriate dispatch center. As explained elsewhere in this report, Year 2000 problems with switching or transmission equipment could interfere with the routing of the call to the appropriate dispatch center, or PSAP.

The second step is the actual processing of the emergency call, usually at the PSAP. There are approximately 4,300 PSAPs in the country. Communities without PSAPs rely on public safety agency operators and communications centers to process these calls. At the PSAP, the operator verifies or obtains the caller's location, determines the nature of the emergency, and decides which emergency response teams should be notified. In most cases, the caller is then conferenced or transferred to a secondary PSAP from which help will be dispatched. Secondary PSAPs might be located at fire dispatch offices, municipal police headquarters, or ambulance dispatch centers. Often, a single primary PSAP will answer for an entire region. The PSAP is especially vulnerable to Year 2000 problems because they generally rely on sophisticated computer technology and they interconnect with many private networks with different types of equipment.

There has been significant activity in response to the importance of 911 calls and PSAPs. The Commission hosted a forum in November 1998 involving representatives from wireline carriers, manufacturers, local officials, and federal emergency management officials, to coordinate the efforts of the various groups involved in monitoring aspects of emergency communications. Representatives from large telephone companies described their efforts to contact PSAPs within their operating territories.

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Focus Group 2 of NRIC 2 has made PSAPs one of its key study areas within the broader category of customer premises equipment devices (CPE), primarily because of the key role PSAPs play in the proper dispatch of emergency services personnel. At the January 1999 meeting, NRIC reported some initial findings regarding PSAPs. See Bill Blatt, Presentation of Focus Group 2 (January 14, 1999) <www.nric.org/meetings/>. Calls to PSAPs are delivered through the public network, and NRIC noted that the Year 2000 upgrades to network elements such as central office switches and 911 tandems fall under the Year 2000 remediation programs of wireline carriers. NRIC further reported that although initial research on address data providers (typically, a function outsourced by wireline telephone companies) showed good Year 2000 programs, but that more information was needed.

The Telco Forum has also been engaged in 911 testing with three major PSAP equipment manufacturers; no failures have been reported. Manufacturers of dispatch equipment have also demonstrated cooperative information sharing by posting readiness information on their respective websites.

Finally, the U.S. Fire Administration of FEMA is working with other organizations to survey the progress of PSAPs in the country, and that some states have undertaken similar surveys. The U.S. Fire Administration survey is currently underway with results forthcoming.

Wireless

The third element of the public safety communications network involves dispatching emergency response teams. Once the call is routed to the appropriate PSAP operator or agency dispatch center, a trained dispatch officer typically uses a wireless land mobile radio system to dispatch mobile units to the scene. During the emergency, these radio systems can be used by emergency units and officers at the scene to coordinate activities amongst themselves, with those units still on their way, and with dispatchers and command bases. These systems can also be used to communicate with additional response resources such as hospitals, morgues, hazmat units, highway agencies and public utilities. Often, however, radio interoperability among different agencies using different radio systems is unavailable, or achieved only through complicated cross-system patches coordinated by the dispatcher or through the use of electronic switches or gateways.

Public safety communications entities are indicating an increased awareness of the urgency of Y2K preparedness for emergency services. At the two Y2K public safety forums held at the Commission in June and November last year, public safety agencies and associations reported that all states and many larger county and city public safety agencies were well on their way to full Y2K readiness. The Commission also heard, however, that many smaller, isolated or more rural agencies may have difficulty understanding or dealing with the problem, and that these agencies may require assistance in addressing Y2K.

Manufacturers report that analog and digital radio systems operating in conventional mode (non-trunked mode not involving computer switching) are not date-sensitive and therefore are not typically at direct risk for Y2K failure. These systems are the kind operated by the vast majority of state and local public safety agencies, including nearly all smaller and rural agencies. For radio systems using computerized trunking, encryption, gateway and other advanced features that are at higher risk for Y2K failure, manufacturers report that they are engaged in active user notification and remediation assistance programs. Many federal agencies, states or

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larger public safety entities that own large, advanced, and expensive systems have dedicated substantial resources to testing, remediation and contingency planning programs in their agencies. The major manufacturers controlling 90 to 95 percent of the public safety equipment market have reported that all new equipment now being sold is Y2K ready, and upgrades or remediation packages for all legacy equipment is now or will shortly be available.

Certain advanced dispatch services such as computer-assisted dispatch (CAD) may be at greater risk for Y2K failure, and replacing these complicated and expensive systems can take more than one year. This means that CAD systems identified now as non-compliant might not be able to be replaced before the year 2000. Failure of one of these systems, however, should not prevent manual, non-computer assisted, emergency dispatch activities until the problem can be solved or a replacement CAD unit can be obtained.

Of course, all public safety wireless licensees, large or small, must also address the possibility of other kinds of Y2K-related computer or embedded chip failures that do not directly involve their radio systems, but the failure of which could affect their ability to communicate or otherwise deliver emergency services. These include possible failures of electronic security systems or electronic features in vehicles. Public safety contingency planning must address the reactions to possible failures of these and other systems, both internal and external to the agencies.

In a recent rulemaking proceeding involving public safety radio spectrum, the Commission sought comment from the public on the best ways of ascertaining both the extent of Y2K readiness in the public safety communications community and the progress and range of compliance initiatives undertaken by that community. The Commission expects to issue an Order early in 1999 to address this issue in light of the numerous comments and replies received in response to this inquiry.

Emergency Alert System

The Emergency Alert System (EAS) is the fourth element to emergency communications. EAS is a national emergency communications system designed to give governments the ability to rapidly communicate with the entire population in times of national emergency. This system has the potential to provide emergency information in conjunction with the news reports, special reports, and other services that broadcast companies normally provide. The EAS system has never been used on a national basis, although it has frequently been used on a state and local level in times of severe weather or other localized emergency.

All broadcast stations and cable systems must participate in EAS; other communications providers may participate voluntarily. A September 15, 1995 White House Statement of Requirements signed by the President required that the Commission and FEMA develop, implement, operate, sustain and have ready the national level EAS. This system replaced the Emergency Broadcast System.

EAS is structured so that national, state and local messages can be injected into the system to alert the public. Industry volunteers work to develop EAS plans that use industry facilities in a coordinated, efficient, and timely manner to alert the public. The National Weather Service digital signaling technique on NOAA Weather Radio and the EAS digital signaling technique are identical. All EAS equipment is based on handling the Julian date of the year.

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The EAS system only recently replaced the Emergency Broadcast System, and new equipment capable of receiving and decoding the EAS header codes and emergency messages was required to be installed at broadcast stations by January 1, 1997. Accordingly, virtually all EAS equipment is new and, according to statements by EAS hardware and software manufacturers, both equipment and software is either compliant or, if not compliant, is being updated and provided to customers. Participants at the Commission's November 16, 1998, Emergency Preparedness Forum confirmed these facts and the overall readiness of the EAS system. Nevertheless, participants recommended that stations take steps to ensure they are staffed the night and morning of December 31, 1999/January 1, 2000.

Cable

Practically all cable vendors of EAS equipment have disclosed that EAS equipment is Y2K compliant. However, since implementation of EAS equipment for all cable systems will not be completed until October 1, 2002 (when cable systems serving less than 10,000 subscribers are required to complete installation and begin operation), the effects of Y2K on the entire EAS network once the various components come on line is still unclear. Cable systems serving greater than 10,000 subscribers must have had EAS equipment installed and operational by December 31, 1998, which provides operators an opportunity to assess the system while operational prior to the year 2000.

Accordingly, the information obtained from the Y2K questionnaire indicates that 45 percent of the cable respondents have examined the effects Y2K may have on the delivery of EAS messages (see Figure 2). This group consisted primarily of large and medium-sized operators. As Figure 3 shows, 76 percent of the respondents, including operators who had not yet installed EAS equipment, did not anticipate any problems with the implementation of EAS. Some small operators indicated that they were unable to know at the current time and reserved judgment until after installation. In situations where EAS or other local emergency notification systems were not already in place, approximately 40 percent of cable operators determined the systems to be Y2K ready (see Figure 4). Finally, approximately 50 percent of cable operators have been able to obtain verification from vendors that their EAS equipment will be Y2K ready (see Figure 5). The remaining respondents have not yet contacted EAS vendors or are awaiting a vendor response.

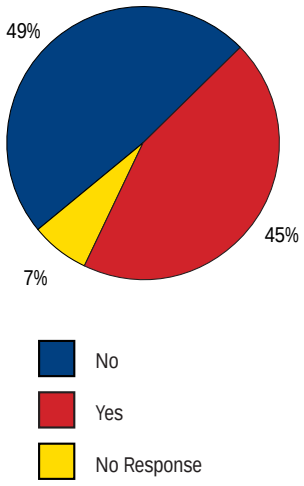

Figure 2. EAS Examined

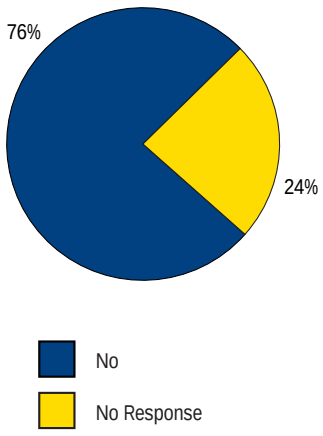

Figure 3. EAS Problems

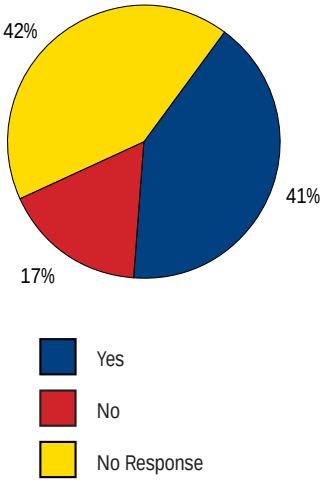

Figure 4. EAS Ready

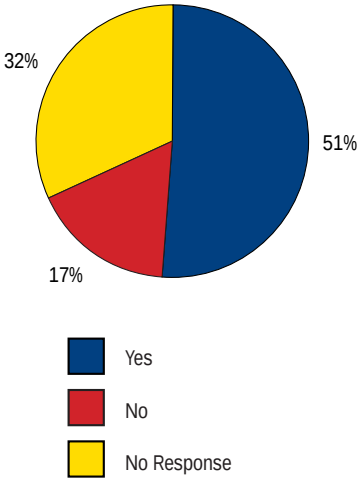

Figure 5. EAS Vendors Certified

Figure 6 and Figure 7 represent the status of EAS and the estimated completion dates. As the figures show, the majority of the respondents are well along in the inventory, assessment, and remediation phases. However, the testing and rollout phases are less than 50 percent complete, with an average completion date of October 1999. The respondents have, on average, completed more than three-quarters of the assessment of the probability of the failure of the EAS and half of the contingency planning. The risk assessment is expected to be completed by July 1999 and contingency plans developed by August 1999 (see Figures 8 and 9).

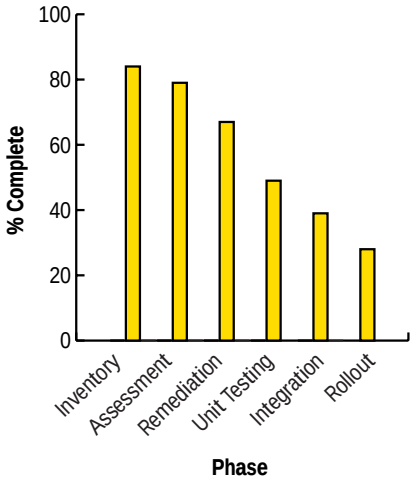

Figure 6. Average Percent Complete — Emergency Alert System (EAS)

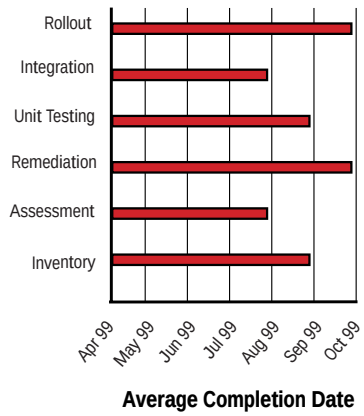

Figure 7. Average Estimated Completion Dates — Emergency Alert System (EAS)

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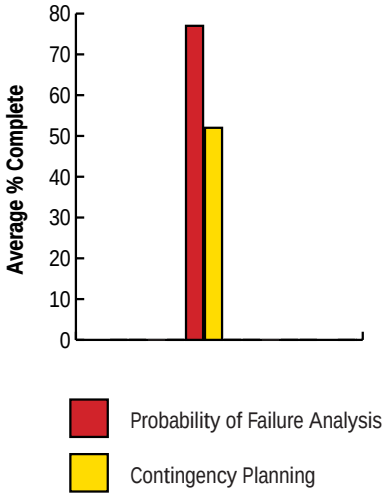

Figure 8. Contingency Planning — Emergency Alert System (EAS)

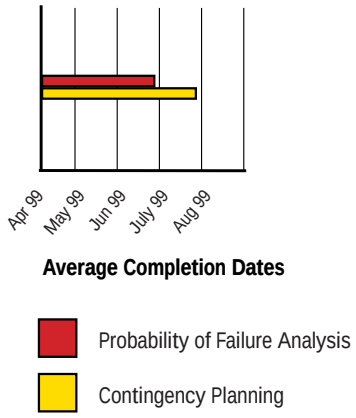

Figure 9. Contingency Planning — Emergency Alert System (EAS)

Broadcast

EAS readiness was also a part of the Commission's assessment of mass media in which it contacted a 230-member cross-section of large, medium, and small licensees. The data indicate that responding licensees are 92 percent complete, on the average, with their inventory of EAS equipment. See Figure 10. Furthermore, they averaged 86 percent completion with their assessment phase, 73 percent with regard to the remediation phase, 67 percent with respect to unit testing, 56 percent complete with integration and system testing, and 48 percent complete with the rollout phase. They, on the average, expect to be completed with these phases anywhere from March 1999 (inventory and assessment phases) to May 1999 (rollout phase). Responding licensees were, on average, 79 percent complete, with their EAS probability of failure assessment and 68 percent complete, in making contingency plans. See Figure 12. The average expected completion dates for these phases are March and April 1999, respectively. See Figure 13.

As was the case with other aspects of broadcast station Y2K readiness, small and large licensees were relatively close with regard to assessment of their EAS systems but medium-sized licensees were lagging behind. For example, while small licensees are, on average, 93 percent complete with the assessment phase regarding their EAS equipment, and large licensees are 90 percent complete, medium-sized licensees are, on average, 80 percent complete. With respect to unit testing, small licensees are, on average, 84 percent complete and large licensees are 70 percent complete, medium-sized licensees are only 54 percent complete. As to system integration and testing, small licensees are 78 percent complete, large licensees are 56 percent complete, but medium-sized licensees are but 39 percent complete and do not expect to complete this phase until, on average, two months after small and large-sized licensees. Responding licensees of all sizes, however, are at relatively the same place with regard to probability of failure analysis and contingency planning with respect to the EAS system.

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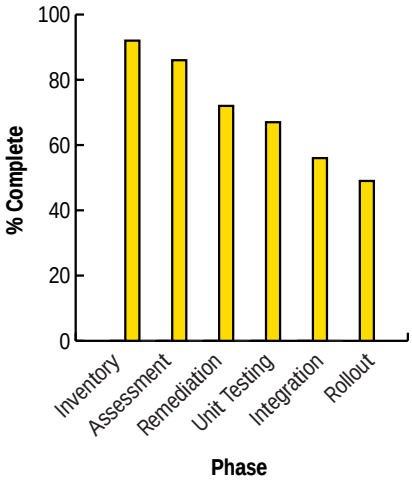

Figure 10. Average % Complete — Emergency Alert System (EAS)

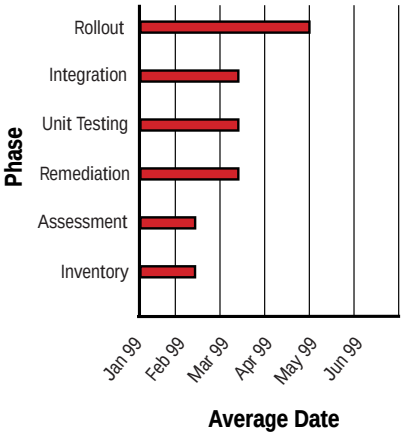

Figure 11. Average Estimated Completion Dates — Emergency Alert System (EAS)

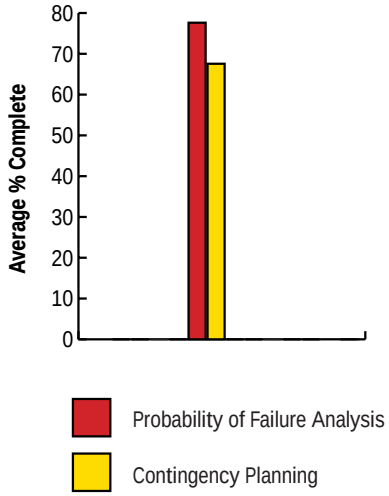

Figure 12. Contingency Planning — Emergency Alert System (EAS)

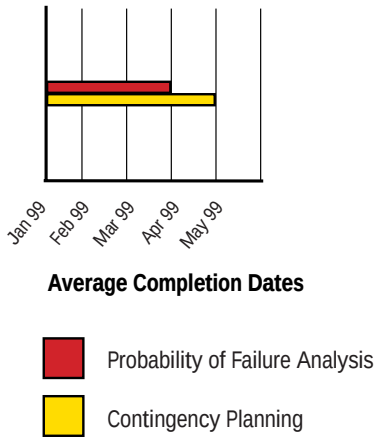

Figure 13. Contingency Planning — Emergency Alert System (EAS)

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Consumer Tips

- Be sure to have a phone available that does not rely on electric power. While regular phone service can operate when there is no power, cordless phones may not.
- Consider fully charging wireless phones and having extra batteries available.
- Consider having a battery-operated radio or TV available in order to receive emergency information and broadcasts.
- Be sure to note the phone number of emergency services; not all services use the same emergency services phone number and “911” has not been implemented in all areas, paricularly with wireless services.
- If you own a CB or marine radio with battery power, check to ensure that the batteries are charged. If circumstances require communications via CB services, be sure to stay clear of emergency channels in order to let emergency communications pass.

Global Positioning System

The Global Positioning Satellite system (GPS) is a satellite-based global navigation system originally developed by the U.S. Department of Defense to enhance the effectiveness of U.S. military forces. Over the years, GPS also has been used in civilian applications requiring precise location information (e.g., mapping, surveying, and navigation). The GPS consists of 24 satellites, with the orbits of these satellites designed so that multiple satellites are passing over any given spot on the earth's surface at any given time. Each satellite transmits a time-coded signal. A GPS receiver then uses data from multiple satellites to rapidly calculate the location, altitude, and velocity of a vehicle or aircraft carrying the receiver. The system uses a timekeeping system that works on a 1024-week cycle, which ends in 1999.

The Department of Defense, which operates the GPS system, has reported that the GPS signal and military GPS receivers are Year 2000 compliant. However, there may be software problems in some civil GPS receivers that may cause Year 2000 Problems. These civil users will need to verify that their receivers and applications will work properly through the Year 2000-related problems.

Some GPS receivers may also be affected by the End-of-Week (EOW) problem. The length of the cycle, know as an "epoch", was set at 1024 weeks so it could be transmitted in a 10-bit block. This means the GPS system time rolls over every 20 years, with the current cycle to change at midnight on August 21, 1999, 132 days before the Year 2000. This EOW rollover problem may misinterpret the August 22, 1999 as January 6, 1980, August 23, 1999 as January 7, 1980 and so on. This is how the precise rollover date is computed:

The time-scale origin (time zero) of GPS System Time, 00:00:00 UTC 6 January 1980, is Julian Day 2,444,244.500. A GPS Cycle is 1,024 weeks, or 7,168 days, so the first GPS rollover will occur at Julian Day (2444244.5+7168)= 2,451,412.5, which is 00:00:00 UTC 22 August 1999 AD, which is the midnight between Saturday night the 21st of August, and Sunday morning the 22nd of August, 1999.

Many receivers will be unaffected by the change, but some may suffer a variety of problems, from temporary shutdown to minor problems in service. It also is possible that some receivers will have positional errors in addition to incorrect dates.

The United States Coast Guard maintains a website <www.navcen.uscg.mil/gps/geninfo/y2k/> that contains a list of civil GPS manufacturers who may be consulted to determine whether their equipment would be affected by the end of the GPS 1024 week calendar, as well as the Year 2000.

Tower Lighting

Tower Lighting

Year 2000-related problems may affect antenna structure owners' ability to properly light their towers, or may affect systems designed to notify owners when lights fail or malfunction. The Commission — in conjunction with the Federal Aviation Administration (FAA) — regulates those antenna structures that may affect air navigation by requiring that many tall structures be painted and lighted. Under the Commission's rules, when a top steady burning light or any flashing light goes out or malfunctions and the problem is not corrected in 30 minutes, the owner must report the outage to the nearest FAA Flight Service Station. The FAA then issues a Notice to Airmen (NOTAM) to warn pilots flying in the vicinity of the dark tower. The owner must correct the problem as soon as possible. Although properly lighted antenna structures provide the best measure of protection to aircraft, the 30-minute notification rule is a well-established means of notifying pilots of light problems for the time between outage and repair.

The Commission has addressed the antenna structure lighting issue though issuance of a Public Notice outlining tower owners' responsibilities in light of Y2K, and by holding a forum in December 1998 on the topic that brought together government, the tower construction and lighting industry, Commission licensees, and tower owners. At the forum, light equipment manufacturers indicated that their systems do not incorporate date-based processing or contain other components that are at risk for Year 2000 failure. Several manufactures have Y2K statements about their products in their sales literature or on their websites. However, some risks may be present at a secondary level. The lighting manufacturers generally could not extend their Y2K claims to components added to their light systems. Typically, such add-ons include monitoring and light-failure record and notification equipment, and alternate power sources. Y2K-related failures of these components would potentially affect an owner's ability to power the lights and to become aware of a light outage. In addition, for those structures without backup sources of power, a representative of the electric power industry asserted that, while widespread power failures are unlikely, smaller "nuisance" outages may still occur. The general consensus of those Forum panelists representing owners was that they appear to be prepared for tower light problems. The Personal Communications Industry Association (PCIA) stated that it has surveyed its members to make sure they have adequately addressed the possibilities of towers not being lit or automatic monitoring systems not being capable of reporting lighting failures. PCIA members indicated that they have determined the likelihood of such failures due to Y2K-related problems is negligible. A broadcast-engineering consultant stated that broadcasters, and others who routinely maintain emergency generators and backup batteries at tower sites, should be able to maintain lighting even if there are commercial power disruptions.

Because the consequences of an aircraft striking an unlighted tower can be fatal, tower lighting is a critical safety issue. Prompt and proper FAA notification is vital for any light outage or malfunction caused by Y2K-related problems. The nearest FAA Flight Service Station will be listed in the phonebook; an owner unable to locate this information should either contact the FAA Regional Office (these are listed on the Application for Antenna Structure Registration form — FCC Form 854) or the nearest airport for assistance.